

A BRIEF HISTORY OF
THE DEPARTMENT OF AERONAUTICAL AND
ASTRONAUTICAL ENGINEERING
AT THE OHIO STATE UNIVERSITY

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INTRODUCTION

The determination of the scope of a history of an academic department of a university is a problem with no easy solution. In this brief account emphasis has been placed on the early years, since this period is apt to be of the greatest interest and at the same time the least known.

One of the difficult aspects of the determination of the scope is the question of the faculty. At one extreme, complete biographies could be included. In the interest of brevity, this account omits all biographies. Generally, those faculty members who served for more than a few years are the ones mentioned in Chapter 2, but a complete listing, with dates of service, is provided in Appendix I.

A similar question arises in connection with students. It is a temptation to mention some of the most outstanding, but since the graduates of the department range through the whole spectrum from prominent to obscure there seems to be no satisfactory criterion for inclusion that will not risk omitting some who are perhaps as worthy of mention as some of those included. Reluctantly, it was decided not to mention any individuals except the earliest graduates.

Realizing how little material has been included in this history, even after many hours of search, the writer finds himself hoping that more information can be collected

and saved for the use of some future writer who will address himself to the history of Aeronautical and Astronautical Engineering at Ohio State.

CHAPTER ONE

THE BEGINNINGS AND SOME MILESTONES

If the date of authorization may be taken as the beginning of a department, then 8 March 1943 is the birth date of the Department of Aeronautical and Astronautical Engineering at The Ohio State University. It was on this date that the Board of Trustees approved the establishment in the College of Engineering of a new department, the Department of Aeronautical Engineering. Due to war-time complications, the actual organization of the department was delayed for three years.

Although war-time conditions complicated the beginnings of the department, it was World War II that caused the University to reverse its earlier policy of not entering the field of aeronautical engineering instruction. In 1942 a committee was appointed to study the whole question of aviation and aeronautical science. This "University Policy Committee" presented a report dated 21 December 1942 which included six recommendations. The first of five parts of the third of the recommendations was to develop an undergraduate curriculum in aeronautical engineering. Graduate work and research in this field were included in the fourth recommendation.

Some of those interested apparently anticipated the action of the committee as well as the approval by the

Trustees, because the 1942-43 Engineering College Bulletin listed a curriculum in Aeronautical Engineering. Five courses were listed under the department name, the curriculum was filled out with relevant courses in Mechanics, Mechanical Engineering and Industrial Engineering.

It was not until 1946 that the department really came into existence. Garvin L. Von Eschen was brought from the University of Minnesota to become the chairman and to organize the department. Edward Miller was the first to join him, being hired as an Instructor working on a Master of Science degree. Also during the first year Knox Millsaps, at that time at Wright-Patterson Air Force Base, was recruited for the new staff. The department was given office space in the southeast corner on the first floor of Robinson Laboratory, also a small war-surplus hut located just east of Robinson where part of the Physics building now stands. This hut was used to store war-surplus equipment which Professor Von Eschen was beginning to accumulate.

During the first year the department had a few undergraduate students, completing work previously started, and two graduate students.* As the post-war rush of students continued, the second year of the department saw a considerable increase in enrollment. A number of veterans, whose

*See Table 1 in Appendix Two for undergraduate enrollment in the years before Autumn Quarter 1946.

previous education had been interrupted at various stages, enrolled in Aeronautical Engineering. A temporary building, standing on part of the same ground now occupied by the Civil-Aero Building and Hitchcock Hall, was assigned to the department. The building was of two-story wooden construction with three classrooms on the first floor and offices on the second floor. It was called "Engineering Annex B" and was one of three war-surplus buildings shipped to the campus in pieces and reassembled on a site which had previously been open land along Neil Avenue between West Woodruff and Nineteenth Avenues. Two more instructors were added to the teaching staff, Frank Mallett and Lloyd Yates.

The department used Annex B until March, 1957, when space was assigned in part of the second floor of Townshend Hall so that the temporary buildings could be removed to make way for the construction of the Civil-Aero Building. The new building was occupied on 19 December 1959. Many of the students and faculty members helped assemble tables and chairs for the classrooms in the last week of the year, and the rooms were ready for classes for the Winter Quarter, 1960.

In the meantime, consideration was being given to the name of the department. The successful launching of artificial satellites had brought attention to the astronautical part of the department's activities. Many departments

of Aeronautical Engineering in other universities had changed their names to Aerospace Engineering or some other such name that reflected the dual nature of the field. In April of 1960 the department requested that its name be changed to the "Department of Aeronautical and Astronautical Engineering". With the approval of this request the department gained its present designation and began to grant the degree of Bachelor of Aeronautical and Astronautical Engineering.

CHAPTER TWO

THE FACULTY

In the second year of the department's operation with its own staff, Professors Von Eschen and Millsaps with the three instructors, Mallett, Miller, and Yates, comprised the teaching staff, as mentioned in Chapter One. In addition, Carroll Peirce, the Director of the School of Aviation at Don Scott Field, was attached to the department and assisted with some of the instruction. For the academic year 1948-1949, Mallett and Miller became Assistant Professors and Arthur Tifford joined the department and remained a member for ten years. The following year brought Bruno Boley to the staff for a three year stay.

From the beginning the faculty has represented a strong mixture of analytical and experimental interests, in many cases both being represented in the same individuals. Also established from the beginning was the department's interest in undergraduate students, who have not been neglected in favor of graduate work and research. A good balance between teaching and research has always been a characteristic of this department.

Until about 1957 the size of the faculty, including instructors, averaged about seven. This figure increased in the late fifties and during the sixties has averaged about eleven, with some of these only part-time, devoting

the rest of their time to research projects.

Of the present staff, Professors Von Eschen and Mallett remain from the early years, as well as Professors Rudolph Edse and John Lee, who joined the department in 1951 and 1953, respectively. Professor Lee Petrie started as an instructor in 1959, as did Professor Gerald Gregorek in 1960. Also in 1960 Professor Buford Gatewood joined the department. Professor Robert Nerem started as an instructor in 1962. In 1964 Professor Odus Burggraf returned to the department in which he had once been an undergraduate student, and Professor Ting Li joined the department. The two most recent members of the faculty are Professor Cecil Bailey, 1967, and Professor Jeffrey Young, 1969. In the summers of 1967 and 1969 Keith Stewartson of the University of London was a visiting professor, and it is planned that he will continue to serve in future summers.

In Appendix One is a list of past and present members of the faculty, including instructors, with dates. The first year given is the date of joining the department, a second year shows the date of leaving.

CHAPTER THREE

THE COURSE OF STUDY

The Early Years

Between the time of the authorization of the department and its actual organization under Professor Von Eschen a curriculum in Aeronautical Engineering was offered under the auspices of the Department of Mechanical Engineering. That it attracted students is shown by Table 1 of Appendix Two. Examination of college bulletins for 1942-3, 1943-4, 1944-5 and 1945-6 shows a curriculum in Aeronautical Engineering for these years. The (nominal) department is also listed under "Departments of Instruction" with two courses offered, 601, Aerodynamics, and 610, Aircraft Stress Analysis. The curriculum resembled that in Mechanical Engineering, but included the following relevant courses, along with others:

Third Year

Mechanics 610, Mechanics of Fluids

Physics 647, Physics of the Atmosphere

Aero. Eng. 601, Aerodynamics

Ind. Eng. 441, Air Frame Forming and Joining

Aero. Eng. 610, Aircraft Stress Analysis

Mechanics 650, Aircraft Problems

The fourth year included two options, A and B, of which the second emphasized structures.

Fourth Year

(not offered until Winter 1944)

Mech. Eng. 703, Aeronautical Engines

Aero. Eng. 701, Aerodynamics

Aero. Eng. 710, Structures

Mech. Eng. 704, Aeronautical Engines (option A)

Aero. Eng. 710, Aircraft Structures (option B)

Aero. Eng. 721, Propellers

Mech. Eng. 781, Aeronautical Laboratory

Aero. Eng. 712, Aircraft Structural Details (option B)

In the bulletins for 1944-5 and 1945-6 the fourth year is marked "tentative" rather than "not offered...".

The bulletin for the first year of the actual organization of the department, 1946-7, lists nine courses including 950, Research. In addition to the courses 601, 610, 701, 710 and 711 mentioned above, AE 713, Aeronautical Laboratory and two graduate level courses, 810 and 812, are shown.

At this time an aeronautical course not open to engineers was listed as Mechanical Engineering 504, General Aeronautics. It was required of students electing a new air transport curriculum in the Commerce College and was designed to acquaint them with some of the technical aspects of aircraft. It was transferred to Aeronautical Engineering as A.E. 501 in 1948 where it remained for five

years. It was finally dropped when, no longer required by Commerce, it had fallen into disuse.

Three-Hour Courses and Five Options

The Engineering College Bulletin for 1947-8 shows the first full-fledged curriculum for Aeronautical Engineering. Under "Course of Instruction" were listed 59 courses. Of the 33 in the 600-700 number range, twelve were marked as not being offered that year, but all were offered the following year. Listed separately was a fourth year program for the old four-year curriculum. The five-year curriculum was listed in its entirety. The first aeronautical course was not taken until the spring quarter of the third year. This first course, A.E. 640, introduced the student to the nature of aircraft and their components. The more analytical work commenced in the fourth year. In the summer between the third and fourth years the student was given a choice between flight training and "summer experience" on a job.

For the fourth and fifth years the student chose from five options, Aerodynamics, Flutter and Vibration, Propulsion, Stability and Control, and Structures. Some courses were taken by all, the remaining course selections were governed by the choice of option. Most of the courses were for three hours of credit, and covered a wide range of subjects, as partly reflected by the options. A laboratory

course and an aircraft design course were taken by all students.

In the academic year 1948-49 two courses were added that presaged the space age. Called Exterior Ballistics I and II, they went somewhat beyond the classical exterior ballistics in being concerned with orbits of hypothetical artificial satellites. These courses were joined by three more the following year, when Exterior Ballistics III and Missile Ballistics I and II were added. Courses devoted entirely to viscous aerodynamics and to superaerodynamics (very low density, or high altitude, aerodynamics) were also added. By the next year, the total number of courses listed had risen to 71. This listing remained for two more years.

Five-Hour Courses and Three Options

The first major change in the curriculum went into effect in the academic year 1953-54. A consequence of the three-hour course pattern was that the students were studying too many different subjects at once, often as many as six. For this reason the department decided to make most of the undergraduate courses five hours each. This necessitated a considerable revision of the course structure, and reduced the total number of courses to 61. At the same time the five options were consolidated into three, Aerodynamics, Propulsion, and Structures. Flutter and Stability

and Control were not, however, removed from the curriculum. The student's introduction to his major still came with A.E. 640 in the spring quarter of his third year. There was no change in the mathematics required after the Calculus, although the previous year there had been introduced A.E. 691, a course that was designed to show aeronautical applications of mathematics.

For the academic year 1956-57 a change was made in the introductory course. A new course, A.E. 642 was placed in the autumn quarter of the third year, with an aerodynamics course in the spring quarter. The following year 642 was moved to winter, but it still provided the student with an earlier start on his major than had prevailed earlier.

In 1957-58 an additional course in Mathematics was required. Previously, the three courses beyond the calculus had been, respectively, ordinary differential equations, partial differential equations, and a combination of vector analysis and complex variable. It was decided that one three-hour course was not enough for these last two subjects, and a separate course in each was required.

The Professional Division

The academic year 1959-60 was the first year for several changes. At the College level, the separation into the "pre-professional" and "professional" divisions was adopted. With the professional division including the last

three years, a curriculum for the first two years became possible that was more nearly common for all departments in the college. Included in the common first two years was a change in the Mathematics requirements. Instead of starting with "College Algebra", the first course listed was the course that had been third, the analytical geometry and beginning calculus course. With two quarters thus gained, ordinary differential equations and statistics were then included in the winter and spring quarters of the sophomore year. The statistics course was dropped in 1967.

These changes, of course, were college-wide. For the department it meant that the four third year courses could be reduced to three, since the ordinary differential equations would already have been taken. The applications course, 691, was also dropped at this time. Another change resulted in three Aero courses being included in the third year, the introductory course in the autumn, aerodynamics moved to winter and a beginning structures course moved forward to the spring.

More noticable changes also took place at the same time. The options were dropped and more use made of technical electives. The basic course pattern was changed when almost all of the undergraduate courses were changed to four hours. The five-hour courses had proved to provide too little flexibility in curriculum arrangement, as a

given subject could be assigned only five hours or ten, or other multiple of five. In some cases five was more than needed, in other cases, five was not enough, but ten too many. Since the five-hour pattern seemed to be the opposite of the old three-hour pattern, the obvious compromise was tried and has been quite satisfactory. It provides for a basic student load of four courses for a total of sixteen hours.

Professional Division Curriculum, 1959-60

THIRD YEAR

- Autumn: Math 622, Vector Analysis
 Eng. Mech. 602, Strength of Materials
 Aero. E. 642, Introductory Aeronautics
- Winter: Math 609, Fourier Series and Boundary Value Problems
 Physics 614, Introduction to Modern Physics
 Met. Eng. 611, Structural Materials
 Aero. E. 673, Applied Aerodynamics
- Spring: Math 624, Complex Variables
 Physics 603, Intermediate Heat
 Eng. Mech. 617, Dynamics
 Aero. E. 610, Aircraft Stress Analysis

FOURTH YEAR

- Autumn: Mech. Eng. 611, Heat Transfer
 Aero. E. 705, Aerothermochemistry I
 Aero. E. 706, Ideal Aerodynamics
 Aero. E. 710, Aircraft Structures
- Winter: Elec. E. 642, Electrical Engineering
 Aero. E. 707, Compressible Aerodynamics
 Aero. E. 716, Unsteady Aerodynamics
- Spring: Elec. E. 644, Industrial Electronics and Control
 Aero. E. 760, Propulsion I
 Aero. E. 775, Aerodynamics of Viscous Fluids I

FIFTH YEAR

Autumn: Aero. E. 713, Aeronautical Laboratory
 Aero. E. 724, Aircraft Stability and Control
 Aero. E. 762, Propulsion II
 Aero. E. 776, Aerodynamics of Viscous Fluids II
 Aero. E. 790, Seminar

Winter: Aero. E. 740, Preliminary Design of Aircraft
 Aero. E. 754, Aeroelasticity I
 Aero. E. 791, Seminar
 Technical Elective (2)

Spring: Aero. E. 731, Aircraft Design Laboratory
 Aero. E. 777, Superaerodynamics
 Aero. E. 792, Seminar
 Technical Electives (2)

In addition, the Basic Education Requirements were to be met during the second, third and fourth years to a total of forty hours, five in Natural Science, and at least fifteen each in the Social Sciences and Humanities for the remaining thirty-five.

The New Four-Year Program

In 1969, effective with the Summer Quarter, the College of Engineering left the five-year bachelor's curriculum and went back to a four-year program. The story of this change belongs in the College history, but its effect on the department can be briefly related. In general, the reduction was effected by "cutting off at the top", i.e. the more advanced courses were no longer required of the undergraduates. In addition, it was necessary to start the work of the department in the sophomore year, which was done by placing one course each in the winter and spring quarters. The mathematics requirements beyond the Calculus were

reduced from fourteen to nine hours, the difference being made up by the addition of a new course in the department, AAE 480, Mathematical Methods in Aeronautical and Astronautical Engineering which has the advantage that various topics can be taken up as needed and related directly to their uses in aeronautical and astronautical courses. As part of the change, the degree awarded under the new program is Bachelor of Science in Aeronautical and Astronautical Engineering.

Curriculum, 1969-70

FIRST YEAR

Autumn: Math. 151, Physics 131, English 101
 Winter: Math. 152, Physics 132, English 102
 Spring: Math. 153, Physics 133, Eng. Gr. 110

SECOND YEAR

Autumn: Math 254, Chem. 204, Eng. Mech. 210, Eng. Gr. 200
 Winter: Math 415, Chem. 205, Eng. Mech. 420,
 A.A.E. 400, Elements of Aeronautics and Astronautics
 Spring: Eng. Mech. 510, Met. Eng. 300,
 A.A.E. 401, continuation of A.A.E. 400

THIRD YEAR

Autumn: Math 416, Elect. Eng. 500,
 A.A.E. 505, Thermodynamics
 A.A.E. 660, Classical Aerodynamics
 Winter: Elect. Eng. 520,
 A.A.E. 480, Mathematical Methods in A.A.E.
 A.A.E. 500, Flight Vehicle Structures I
 A.A.E. 603, One Dimensional Gasdynamics

Spring: English 305, Technical Writing
 A.A.E. 640, Flight Vehicle Structures II
 A.A.E. 661, Compressible Aerodynamics
 A.A.E. 750, Principles of Flight Vehicle Propulsion

FOURTH YEAR

Autumn: A.A.E. 520, Flight Vehicle Dynamics
 A.A.E. 570, Viscous Flow and Heat Transfer
 A.A.E. 641, Structural Design
 A.A.E. 695, Senior Seminar
 Winter: A.A.E. 710, Aeronautical Laboratory
 Electives
 Spring: A.A.E. 715, Preliminary Design of Flight Vehicles
 Electives

Note that the National Defense Option and Physical Education are not listed. In addition, there is a requirement of thirty hours of Basic Education Requirements, to be selected from an approved list in such a way that at least twelve hours each are to be from the Social Sciences and from the Humanities.

Note the new numbering system adopted by the University.

Math 415 covers ordinary and partial differential equations, Math 416, vectors and complex variable.

The department has been accredited by the Engineers' Council for Professional Development, the official accrediting agency for engineering colleges, since 1949.

CHAPTER FOUR

THE STUDENTS

Earliest Graduates

The first graduates of the new department were Nancy Ann Ewing and William A. Gunn, who received the BAE degree on 6 June 1947. There were no additional bachelor's degrees awarded until the following June commencement when a class of thirteen received their degrees, with one more at the end of the 1948 summer quarter, and two more in December.

The first Master of Science degree from the department was awarded to Frank Mallett on 19 March 1948. Shao Yung Tung received this degree 11 June 1948 with three more, Edward Miller, Paul Rowe and Karl Wein, on 3 September 1948. Mr. Wein was the first to receive his degree from this department through the extension center at Wright-Patterson Air Force Base.

The department's first Doctor of Philosophy was Sheng To Chu, who received his degree on 10 June 1955.

Enrollment

The number of students enrolled in the curriculum before the actual organization of the department has been commented on above, and is shown in Table 1 of Appendix Two. Table 2 shows autumn quarter enrollments for the years 1946-1969 inclusive. The average for the four

post-war years, 1946-49, was about 196 in total enrollment, all classes. With the post-war rush ended, the average in the fifties was 180. This figure swelled to 311 for the sixties, perhaps reflecting a post-Sputnik growth in interest. The enrollment figures for upperclassmen, omitting freshmen and sophomores, shows an average of 66 for the first four years, about 77 for the fifties, and about 110 for the sixties. It is notable that autumn of 1969 shows the largest enrollment of any year, and by a considerable margin.

Shown in Appendix Three are enrollment figures for graduate students, also the number of graduate degrees granted by the department. As of the end of the Summer Quarter, 1969, the department had 168 students receive the Master of Science degree, 27 the Doctor of Philosophy.

Student Organizations

A student branch of the Institute of the Aeronautical Sciences was established in 1946, the first year of the department. The name has since been changed to the American Institute of Aeronautics and Astronautics. The purpose of the student branch is to provide the students with opportunities to get acquainted with each other, the faculty, and with the nature of the profession that they plan to enter.

In addition to the student branch there is a chapter of the honorary society in Aeronautical and Astronautical

field, Sigma Gamma Tau. This society was formed by the merger of two earlier organizations with essentially the same purpose, Tau Omega, founded in 1927, and Gamma Alpha Rho, founded in 1945. A chapter of Tau Omega had been installed at Ohio State on 9 December 1950. Sixteen students were initiated as charter members, along with two faculty members, Boley and Mallett, who had not previously been members of the society.

In February of 1953 the two societies met in joint convention to effect the merger. After considerable lack of agreement about which name or what name to use for the new joint society, one of the members of the Ohio State delegation proposed the name Sigma (for summation, or the joining) Gamma (for Gamma Alpha Rho) Tau (for Tau Omega). This suggestion met with immediate approval.

Besides providing recognition for outstanding students, the chapter provides service for the department, especially in liaison between the department and the student.

CHAPTER FIVE

THE AERONAUTICAL AND ASTRONAUTICAL RESEARCH LABORATORY

Since its authorization in 1943 and its initial staffing in 1946, the Department of Aeronautical and Astronautical Engineering has been developing its research and graduate training capabilities. Active construction of the Aerodynamic Laboratory was initiated in 1949 and the first wind tunnel tests were conducted in 1950. The Rocket Research Laboratory, originally developed near the end of World War II, was transferred from the Chemistry Department to the Department of Aeronautical Engineering in 1951. The two research laboratories are now combined and known as the Aeronautical and Astronautical Research Laboratory (AARL) located at the University Airport, Don Scott Field.

The creation of facilities for research from nothing forced the Aerodynamic Laboratory to facility-development types of contract support during the early years of operation. Although some facility-oriented research continues, increasing emphasis is continually being placed on more basic studies utilizing the apparatus and intellectual talents accumulated and developed until most studies now being conducted can be classified as basic. The research program of the Rocket Laboratory of this department was initiated on a more basic level from the beginning because of the physical transfer of the Laboratory and some

personnel from the Chemistry Department.

The experimental facilities of the Department are currently being used to conduct basic research and to train graduate and undergraduate students in experimental techniques. From the viewpoint of equipment, these facilities are among the most advanced to be found in any university.

In the Aerodynamic Laboratory, originally located in a hangar at the University Airport, the 12-inch blowdown supersonic wind tunnel was first operated in 1950. In 1952, the 12-inch transonic wind tunnel began operating as a model tunnel for the Air Force 16-foot tunnel at Tullahoma. In the ensuing years various research studies were conducted and to facilitate data handling, an analog computer was installed in 1954; partly funded by North American Aviation, it was the first use of such a computer for the "on-line" reduction of wind tunnel data. Hypersonic flow studies were started in 1954 and a 12-inch wind tunnel was developed as the first in the country capable of continuous operation with temperatures from 1000°F to 2400°F and Mach numbers up to 15. Since then research studies have been conducted on a variety of hypersonic flow problems. In 1962, development was begun on the use of electric arc discharges for driving a shock tube. Research has since been conducted on a variety of hypervelocity

problems, including gas radiation, utilizing that high-energy shock tube. Over the same period, research studies were conducted with a continuous arc-heated (plasma) tunnel particularly in conjunction with electron beams and ion beams.

Much of the early Rocket Laboratory work dealt with premixed propellants and oxidizers, particularly hydrogen and oxygen. Research on detonations and related pressure oscillations, and the chemical kinetics of combustion with various gases have been performed for many years. The feasibility of supersonic combustion has also been explored in recent studies.

In recent years the research contracts handled by the laboratory have averaged about a half million dollars a year.

APPENDIX ONE

TEACHING PERSONNEL

Cecil D. Bailey, 1967-
Willard P. Bergren, 1949-50
Bruno Boley, 1949-52
Loren E. Bollinger, 1958-66
Odus R. Burggraf, 1964-

Sheng To Chu, 1952-61
Ralph G. Dale, 1958-64
Rudolph Edse, 1951-
William E. Eiselstein, 1950-51
E. Stokes Fishburne, 1960-67

Buford E. Gatewood, 1960-
Alva R. Glaser, 1963-66
Gerald M. Gregorek, 1960-
William H. Lane, 1957-58
John D. Lee, 1953-
Ting Y. Li, 1964-

Frank McL. Mallett, 1947-
Edward L. Miller, 1946-50
Knox T. Millsaps, 1946-49
John A. Murphy, 1959-61
Theodore C. Nark, Jr., -1958-60
Robert M. Nerem, 1962-

Carroll J. Peirce, 1947-52
Stuart L. Petrie, 1959-
Keith Stewartson - summers, 1968, 1969
Francis Sturms, 1957-58
Matthew A. Sutton, 1952-58

Richard E. Thomas, 1958-64
Robert N. Thurston, 1949-50
Arthur N. Tifford, 1948-58
Benjamin H. Ulrich, Jr., 1964-66
Garvin L. Von Eschen, Chairman, 1946-

Lloyd D. Yates, 1947-50
Jeffrey O. Young, 1969-
Vincent P. Zimnoch, 1951-52

APPENDIX TWO
UNDERGRADUATE ENROLLMENT

Table 1

By class and quarter, from the
Spring Quarter 1943 Through Summer Quarter 1946

Quarter Class	Fr.	So.	Jr.	Sr.
Sp. 1943	14	3	5	0
Su. 1943	21	10	3	0
A 1943	19	15	3	0
W 1944	27	6	3	1
Sp. 1944	15	8	5	0
Su. 1944	8	4	4	0
A 1944	38	14	2	0
W 1945	29	9	1	0
Sp. 1945	24	9	1	0
Su. 1945	9	4	0	0
A 1945	52	9	2	0
W 1946	60	19	4	0
Sp. 1946	72	21	6	0
Su. 1946	63	20	5	0

These figures reflect the fact that because of the war, most students who entered were unable to remain in school.

Table 2
Autumn Quarter Enrollments, 1946-1969

Year	Total Students	Upperclassmen*
1946	226	23
1947	241	65
1948	174	95
1949	141	81
1950	123	65
1951	109	51
1952	138	51
1953	153	57
1954	165	66
1955	204	71
1956	260	102
1957	248	122
1958	229	107
1959	172	79
1960	159	72
1961	182	62
1962	220	71
1963	242	100
1964	360	112
1965	324	122
1966	409	116
1967	372	123
1968	387	142
1969	456	183

*Omitting Freshmen and Sophomores

APPENDIX THREE
GRADUATE ENROLLMENT

Year	Autumn Quarter Enrollment	Degrees Granted	
		M.S.	Ph.D.
1946-47	6*	0	0
1947-48	22*	2	0
1948-49	21*	8	0
1949-50	16*	8	0
1950-51	20*	8	1
1951-52	18*	7	0
1952-53	22	7	0
1953-54	18	2	0
1954-55	32	2	1
1955-56	23	3	0
1956-57	22	8	0
1957-58	55	6	2
1958-59	39	8	0
1959-60	71	2	1
1960-61	63	6	1
1961-62	73	2	2
1962-63	72	5	2
1963-64	78	7	1
1964-65	90	11	4
1965-66	82	23	4
1966-67	78	16	4
1967-68	85	11	1
1968-69	98	13	3
1969-70	103	-	-

*Figures for separate quarters not available for these years - these are average quarterly enrollments.